Hey there! Thank you for reading the Vernon Brightman Research Society’s newsletter. VBRS is the primary student research organization at Penn Dental Medicine. Since its inception, VBRS has helped numerous students find their niche in research both within and outside of Penn. The society aims to promote interest, participation, and appreciation of basic and clinical oral health research that keep dentistry a science and research-based profession. As future healthcare providers, it is vital that we be able to critically analyze the results of oral health findings as well as the efficacy of newly developed dental materials, tools, and techniques. This newsletter highlights research accomplishments, resources and upcoming events happening here at Penn. We hope you enjoy!

Yours Truly,
VBRS Board
Dear Fellow members of Vernon Brightman Research Society,

Our Society is pleased to have opened another successful chapter of its lifetime in service of our vibrant and ever-inquisitive student body. Our chapter is indeed at great advantage of a rich research-oriented academic environment and our organization strives to leave no stone unturned when it comes to providing the appropriate resources for our current student body to find the research subjects they are passionate about.

Due to UPenn’s unique campus arrangement to have all healthcare and engineering departments within one large complex, we have witnessed strong inter-departmental collaborations to advance several areas of research such as stem cells. Our students’ involvement have crossed the borders of dental research to contribute to multidisciplinary activities with medical, engineering and public health areas of research. Moreover, our students benefit from having numerous research programs to select from, some of which being the Master’s in translational research, Research Honor’s program, and summer research program.

This year, we initiated our activities with an informative panel discussion of select research students with our D1s and further advanced this within another setting to bring research faculty and students together in a Research Mixer event. Towards the goal of promoting research experience for our students, VBRS has upcoming fundraising events to provide financial means for select students to be involved in summer research programs as well as funding to participate in major national dental research meetings such as AADR.

Our hardworking VBRS board members have no wish but to provide means of success for our student body, and each of us is within your reach to help you in any way possible.

I hope you all enjoy our Fall version of VBRS Articulator newsletter, and we wish you the best in your road to great accomplishments in areas of dental research.

At last, when it comes to your commitment to research, remember the road to success is paved with failures.

Stay Optimistic,
Nima Missaghian
Vernon Brightman Research Society | Chapter President
“Vernon Brightman was a kind, well-educated and creative man. Like many Australians, he had a typical dry sense of humor. One of my favorite photos of him, in an SDM yearbook, was an illustration of a conversation between him and another faculty member from “the colonies” in South Africa. They were gesturing at each other; and the caption read, “I talk funny? You talk funny!” Someone once asked why our sons hadn’t gone into dentistry or medicine. He appeared to think for a moment, and then responded seriously, “I suppose it’s because they are basically intelligent men.” In an interview at one time, he was asked what his hobby was. He replied, “Dentistry.” But he was very dedicated to interaction with patients. He spent time with his patients, and with students, and was a good listener. On the commemorative plaque in the second floor oral medicine clinic is a single quotation, “Listen...” In the present era of automation, clinicians are rarely taught that listening to the patient’s “chief complaint,” and the following history, are often the most crucial part of the diagnosis and treatment planning. It pained him to have a student come up to him in clinic and say, “This tooth #18....” He responded, “...and the patient’s name is?” It mattered to him to know about the patient, and to improve the quality of that patient’s life. We trust that his students remember this about him.”

- Signe A. Brightman and family

Dr. Vernon J. F. Brightman was a professor of oral medicine in the forefront of research in infectious diseases. Dr. Brightman begun his affiliation with Penn’s School of Dental Medicine in 1960, often carrying up to half a dozen roles at once as he engaged in teaching, research, dental practice and administrative assignments at the Dental School, HUP and other local hospitals.

In over 100 scientific papers, book chapters and abstracts, Dr. Brightman examined a wide spectrum of oral health problems. For example, as one of the editors of the well-known Burket’s Oral Medicine (the ninth edition issued in 1994), he contributed chapters on red and white lesions; benign tumors including gingival enlargement; diseases of the tongue; chronic oral sensory disorders—pain and abnormalities of taste; oral symptoms without apparent physical abnormality; sexually transmitted and blood-borne infections; and rational procedures for diagnosis and medical risk assessment. He also wrote on volunteerism and community programs as they relate to the dental curriculum, and the challenge of providing access to oral health care.
Description: Students work full time in July and August with a faculty preceptor on a mutually-agreed upon research project in basic laboratory or clinical sciences. The purpose of this program is to provide dental students a chance to experience a “hands on perspective,” especially for those interested in pursuing research oriented careers in the oral health field, thereby promoting dentistry as an academic and research based medical science.

How to Apply: Students must submit a proposal of the project and fill out an application at http://www.dental.upenn.edu/research/student_research/summer_research_program

Application Due Date: April 2, 2018

Contact: Dr. Joseph DiRienzo, Assistant Dean of Student Research

Dental education today encompasses not only didactic and clinical instruction but also an awareness of the importance of advancements in the field that come from oral health research. That is why a key element of dental education is the availability of opportunities for dental students to learn, first-hand, scientific methods and approaches.

The summer of 2018 brings another, or for some of you a first, chance to take part in a research-based extracurricular activity here at the School of Dental Medicine. There are several ways to take advantage of the offerings spearheaded by the Summer Research Program and Honors in Research. The Summer Research Program has been in existence since the late 1970s and has provided a platform for students to gain experience working in a basic science laboratory or clinical setting. Students work during July and August on a research project headed by nationally/internationally known faculty, many of who have expertise in health-related fields. The Honors Program in Research is open to talented students who plan, implement and execute a hypothesis-driven research project over a one to two year period. Students who carry out a research project in either format not only learn what research is all about, or continue to exercise their skills based on prior research activities, but also have the opportunity to present their results at national and international dental meetings. Our research students have gone on to successfully compete for fellowships, awards and research initiatives outside of the School of Dental Medicine. These programs provide an unparalleled experience and challenge for students and are a way to enhance expertise as skilled practitioners.

Joseph DiRienzo, PhD.
Professor of Microbiology & Assistant Dean for Student Research
RESEARCH HONORS PROGRAM

Description: The Honors in Research Program is open to talented students who will plan, implement and execute a hypothesis-driven research project over a one to two year period.

How to Apply: Students must submit a proposal describing the project and fill out an application at https://www.dental.upenn.edu/research/student_research/research_honors_program

Application Due Date: May 15, 2018

Contact: Dr. Kathleen Boesze-Battaglia, Director of Honors Program

NIH/NIDCR Summer Student Dental Program

Description: 8 week summer research program at the NIDCR

How to Apply: Complete the Summer Internship Program Application on the NIDCR website at https://www.nidcr.nih.gov/CareersAndTraining/Fellowships/DentalMedicalStudents/NIDCRSummerDentalStudentAward/

Application Due Date: January 15, 2018

Contact: Deborah Philip, dphilp@dir.nidcr.nih.gov
Dr. Henry Daniell is a Professor in Department of Biochemistry and Director of Translational Research at Penn Dental Medicine. Dr. Daniell was born in India where he was shocked to see many children dying of treatable diseases such as cholera and diarrhea. Although these diseases can be easily prevented with vaccination, the treatment is unaffordable for many countries. Vaccines that are delivered through sterile injection require an unbroken chain of cold storage, which is difficult to obtain in areas with no electricity. Additionally, production of protein drugs such as insulin for diabetes or clotting factor for hemophilia includes a costly purification process, which is not available for 90% of global population. Recognizing this problem, Dr. Daniell developed a strong passion to save lives with plant-based vaccines.

After earning his Ph.D. in biochemistry at Madurai Kamaraj University, Dr. Daniell focused his research on establishing a novel drug delivery platform. Plant-based oral delivery has several advantages. It stimulates gastrointestinal tract immune system as the body’s front line of defense and reduces allergic reactions from the traditional egg-based injections. This drug delivery method will not only increase shelf stability but also lower the cost of medication, which will help achieve Dr. Daniell’s long-term goal to develop inexpensive therapies that are easily accessible in remote areas.

TREATMENT DELIVERY THROUGH PLANTS
by Alisa Lee D’21

At Penn Dental Medicine, Dr. Daniell and his team are actively working together to produce antimicrobial peptides that target harmful bacteria in the mouth. They have recently discovered a highly potent antimicrobial peptide that can kill bacteria in under a minute. Currently, he is collaborating with several organizations to incorporate the antimicrobial peptides in chewing gum to reduce dental caries.

As a translational researcher, Dr. Daniell enjoys having the ability to solve a problem in real time and creating partnership beyond the lab. He highlighted that complex problems can be solved with science and especially for clinicians, “this is the time where students can learn the cutting-edge discoveries and what will be doing in clinics 20 years from now.” When asked what advice he would give to those who are interested in pursuing research, Dr. Daniell encouraged students to “ask questions now to contribute to changing treatments” and “come back to science and be part of problem solving.”

Dr. Henry Daniell can be reached at hdaniell@upenn.edu.
Dr. Jordan-Sciutto is the Chair and Professor in Department of Pathology at UPenn School of Dental Medicine. After earning her Ph. D. from Thomas Jefferson University in 1996, she accepted a post-doctoral fellowship position at University of Pittsburgh, where she combined her training in cell signaling with research on neuroinflammation during HIV infection. Today, Dr. Jordan-Sciutto and her team investigate the molecular basis of neuronal dysfunction, specifically focusing on identifying common players in neurodegenerative disorders such as HIV-associated neurodegenerative disorder (HAND), HIV encephalitis (HIVE), Alzheimer’s Disease (AD), and Parkinson’s Disease (PD).

HAND represents a spectrum of behavioral, cognitive, and motor impairments that affects approximately 50% of HIV positive individuals. Despite the severity and prevalence of HAND, the specific causes of the disorder remain elusive. Interestingly, recent findings by Dr. Jordan-Sciutto and her team suggest that beta-site amyloid precursor cleaving enzyme 1 (BACE1), a protein implicated in AD pathogenesis, may play an important role in the pathogenesis of HAND. When exposed to factors released by HIV-infected macrophages, neurons showed increased expression of BACE1, and pre-treatment with a BACE1 inhibitor (BS1) prevented neuronal loss. Furthermore, they found that HIV-associated toxicity of BACE1 is dependent on the presence of its cleavage target amyloid precursor protein (APP). Translationally, these findings suggest BACE1 is a potential therapeutic target for HAND.

As a prolific researcher, Dr. Jordan-Sciutto is driven by her passion for discovery in science. She enjoys the creative process of designing experiments, and gaining answers to her questions through empirical data. She also stresses the importance of collaboration and mentorship in research. She relishes having discussions with her students as they bring in fresh perspectives, which often leads to constructive, interesting, and novel experimental avenues.

When asked to give advice for students who are interested in pursuing research, Dr. Jordan-Sciutto urges students to give it a try. She highlights that students who practice scientific research can hone their critical thinking skill, which is an invaluable asset to researchers and clinicians alike. She asks the students to keep an open mind, and “embrace the unknown and learn”.

Dr. Jordan-Sciutto can be reached at jordank@upenn.edu
Vernon Brightman Research Society held a Q&A Research Panel with students currently undertaking the various research opportunities at PDM. D1 students were welcomed to ask questions about each program while they enjoyed lunch by Greek Lady.

Panel Participants

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<tr>
<th>Name</th>
<th>Contact</th>
<th>Research Program</th>
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<tr>
<td>Aiman Asiam</td>
<td><a href="mailto:aimana@upenn.edu">aimana@upenn.edu</a></td>
<td>Colgate Clinical Research Internship</td>
</tr>
<tr>
<td>Tejasi Avasare</td>
<td><a href="mailto:tejas@upenn.edu">tejas@upenn.edu</a></td>
<td>Masters' Thesis, Certificate in Global Health Studies</td>
</tr>
<tr>
<td>Sahil Gandotra</td>
<td><a href="mailto:gandotra@upenn.edu">gandotra@upenn.edu</a></td>
<td>Research Honors and Summer Research Program</td>
</tr>
<tr>
<td>Matt Kralik</td>
<td><a href="mailto:kralik@upenn.edu">kralik@upenn.edu</a></td>
<td>Summer Research Program</td>
</tr>
<tr>
<td>Andrew Ng</td>
<td><a href="mailto:ajng@upenn.edu">ajng@upenn.edu</a></td>
<td>LDI SUMR (Health economics/policy research via Wharton)</td>
</tr>
<tr>
<td>Jackie Rabadi</td>
<td><a href="mailto:rabadij@upenn.edu">rabadij@upenn.edu</a></td>
<td>Summer Research Program</td>
</tr>
<tr>
<td>Nishat Shahabuddin</td>
<td><a href="mailto:nishats@upenn.edu">nishats@upenn.edu</a></td>
<td>Masters in Translational Research</td>
</tr>
<tr>
<td>Leslie Tay</td>
<td><a href="mailto:tayl@upenn.edu">tayl@upenn.edu</a></td>
<td>Invisalign Clinical Affairs</td>
</tr>
<tr>
<td>Sherry Wan</td>
<td><a href="mailto:sherx@upenn.edu">sherx@upenn.edu</a></td>
<td>Summer Research Program</td>
</tr>
<tr>
<td>Milo Yu</td>
<td><a href="mailto:milojoyu@upenn.edu">milojoyu@upenn.edu</a></td>
<td>Summer Research Program</td>
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Research Mixer

December 6, 2017

This event is a great way to meet with multiple professors involved in research, and learn of their current projects. During the event, students were able to introduce themselves to the principle investigators and their lab members in a social setting.

The University of Pennsylvania School of Dental Medicine (UPSDM) provides several opportunities for students to be involved in research. Students who elect to participate, learn to ask questions, research approaches to solving problems and learn the scientific methods that have led to discoveries and treatments that are being used in dentistry. In addition to obtaining a deeper understanding of your research subject, students benefit from the experience of presenting their work and networking with colleagues and faculty engaged in similar research. Students who are interested in specializing or further education often find that their research experience is a significant advantage to furthering their careers.

The Vernon Brightman Student Research Society (VBRS) in collaboration with the SDM organizes an annual health fair where students present their research. VBRS sponsors students selected at the fair to travel to research meetings to present their work. VBRS is named in honor of Dr. Vernon Brightman. Dr. Brightman was a professor of Oral Medicine and in the forefront of research in infectious diseases. He champion for the cause of student research at the SDM.

Francis K. Mante, Ph.D, DMD
Associate Professor & VBRS Faculty Advisor
Invisalign is growing increasingly popular among patients due to its clarity and convenience. Leslie Tay (D’20) had the unique opportunity to work as a Clinical Affairs Intern this summer at Align Technology, Inc. Headquarters - better known as Invisalign - in San Jose, CA. With her previous experiences as a Clinical Research Intern at Memorial Sloan-Kettering Cancer Center’s Department of Surgery in New York City, Tay chose Invisalign over other summer opportunities because she was excited to learn more about the medical and dental device industry and apply her clinical research skills to dentistry. Tay was placed in the Research and Development department on the Product Innovation team where she worked on many projects including literature searches, Removable and Fixed Palatal Expanders (RPE/FPE), primary tooth numbering software, data sorting and entry as well as night-time studies to reduce the amount of time wearing Invisalign.

Throughout the summer research program, Tay learned about a variety of technologies such as the iTero 3D scanner. Invisalign provided all employees with passive aligners and had them go through the whole process of getting scanned and fitted for aligner retainers. This helped her “step into patients’ shoes” by going through the process herself. Additionally, she is now Invisalign certified. One of the big takeaways from her summer research experience was how rapidly the dental field is changing. While at Invisalign, she gained an appreciation of how digital dentistry can truly enhance a patient’s experience while in the dental office. “So many people have anxiety about visiting the dentist. Dental technology can provide a better overall experience for my patients in the future by making procedures faster, cleaner and less painful,” she said during her interview.

When asked about her favorite part of her internship, Tay stated that her co-workers and the laid-back, yet efficient, work environment were the highlights. After graduating from dental school, Tay plans to continue being involved with the company by being an Invisalign provider and participating in research trials as a clinician. Aside from research, Tay is actively involved in ASDA, Student Council, Operation Smile and Psi Omega Dental Fraternity. She enjoys swimming and trying new restaurants as an avid Yelp Elite in her spare time.

Leslie Tay D’20 can be reached at tayl@upenn.edu.
**Vendor Fair**
March 2018
Multiple dental equipment, practices, insurance, etc. companies will be in attendance. We hope that you will learn of the many different business opportunities and tools available to become a successful dentist.

**Research Proposal Workshop**
April 2018
A small group of students will meet with a resident who has previously participating in summer and honors research. This is an opportunity to learn how to write your thesis, and introduce newcomers to how a lab might operate. This event will be by RSVP only.

**Research Day**
May 10, 2018
A big day at Penn Dental, as students, residence, and faculty come together to present current progress and outcome of their research in multiple fields. Posters will be presented throughout the school, and there will be a poster competition. Winners will receive a stipend to attend a national research competition.
I am delighted to celebrate the launch of *Articulator*, a biannual student research newsletter by VBRS. We hope to provide the reader of *Articulator* with informative articles that highlight ongoing research by Penn Dental faculty and students. Through the process of developing this newsletter, I had the opportunity to meet various researchers and learn their unique and heartwarming paths to research in dentistry. I would like to give special thanks to the featured researchers and VBRS team for their time and helpful feedback.

If you have any questions or wish to submit an article for the next newsletter, please do not hesitate to contact us at pdmveronbrightman@dental.upenn.edu. Thank you for reading and happy holidays!

Warm regards,

Alisa Lee D’21
VBRS Editor-In-Chief